

First Responder's Role in Fire Investigation



Objectives- FFI

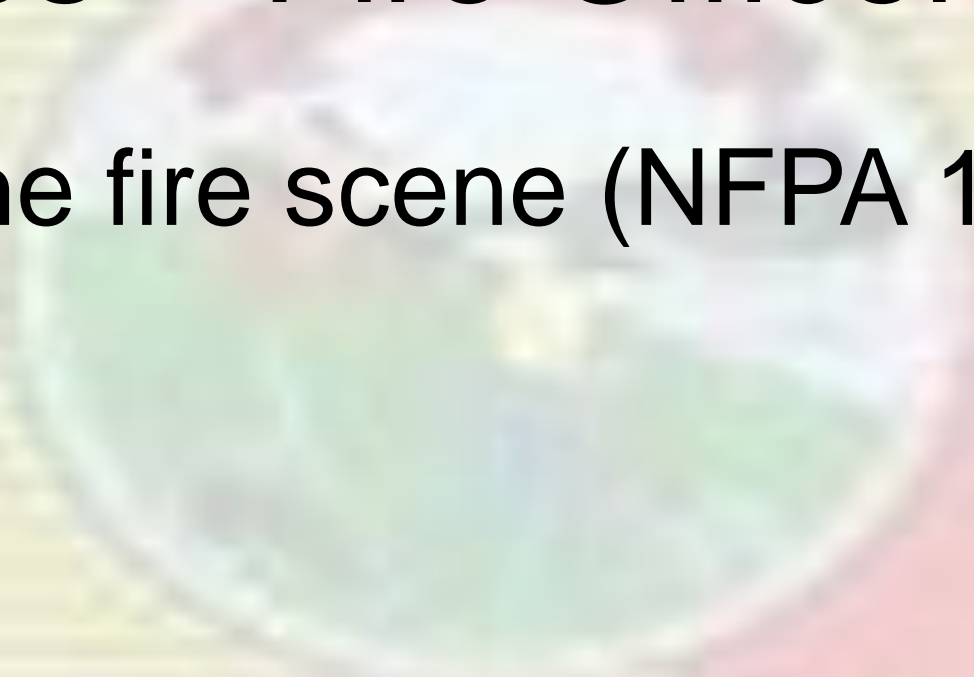
- Differentiate accidental vs incendiary fires (NFPA 1001 5.3.8)
- Describe point of origin (NFPA 1001 5.3.8)
- Define chain of custody (NFPA 1001 5.3.13)
- Techniques to preserve evidence (NFPA 1001 5.3.14)
- Observations made by 1st responders (NFPA 5.3.13)

Objectives – FFII

- Relationship of firefighters to fire, criminal and insurance investigators (NFPA 1001 6.3.4)
- How origin and cause are determined (NFPA 1001 6.3.4)
- Assisting a fire investigator to dig out the scene (NFPA 1001 6.3.4)
- Types of evidence at a fire scene (NFPA 1001 6.3.4)
- Preserving evidence (NFPA 1001 6.3.4)
- Securing the fire scene (NFPA 1001 6.3.4)

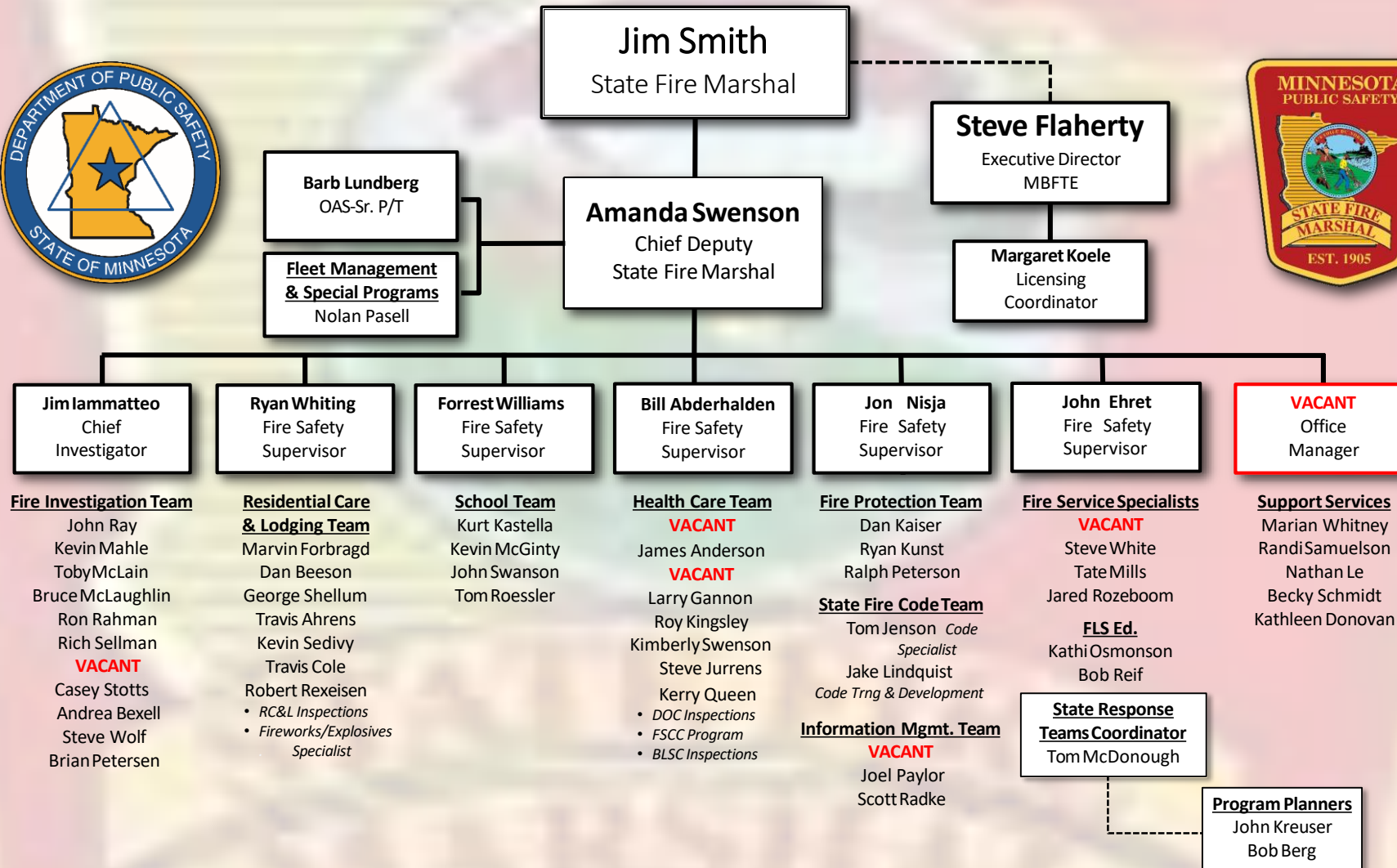
Objectives – Fire Officer I

- Securing the fire scene (NFPA 1021 4.5.3)



Objectives – MN SFMD Resources

- Organizational chart
- Fire, Arson and Explosion Investigation Services Handbook



Why Investigate Fires?



Why Investigate Fires?

- Criminal
- Civil liability
- Consumer product safety
- Fire Prevention

Firefighters Role

- Identify and preserve possible evidence
- Recall and report observations

Who's legal responsibility is it?



A blurred background image of a fire department badge. The badge is shield-shaped with a red border. Inside, there's a green field with a white Maltese cross. The cross has a blue circle in the center. Below the cross, the words "FIRE DEPT" and "SAN FRANCISCO" are visible in a stylized font.

Who's legal responsibility is it?

- Fire Chief or designee

Required to Investigate Fires

Minnesota Statute 299F.04

- Origin of fires investigated

1. Duty

- Fire Chief
- Mayor of City
- President of City Board
- Town Clerk
- Any fire over \$100.00 damage

2. Investigation Begun Within 2 Days of Event

Required to Investigate Fires – cont.

3. Reporting – Notify State Fire Marshal
Within One Week Written Statement of All
Facts
4. State Fire Marshal May Investigate
Possible Arson
5. Must Notify State Fire Marshal of Arson or
Death

State Fire Marshal Division

Fire, Arson and Explosion Investigation Services Handbook

STATE FIRE
MARSHAL

Introduction

- Established 1905
- Primary function is to be a resource to local fire chiefs for fire cause determination

The mission of the State Fire Marshal Division is to protect lives and property by fostering a fire safe environment through investigation, enforcement, data collection and public education.

REQUESTING ASSISTANCE

- Available 24/7
- Contact MN State Duty Officer
Metro (651)-649-5451
Greater MN (800)-422-0798

Address and county

type of fire

Injuries/fatality

Phone number of someone on scene (IC)

Triage Priorities

- Fatal Fires
- Known/suspected arsons
- Serious and/or multiple injuries
- Large dollar loss
- Division inspected properties-ALWAYS CALL TO NOTIFY
- Undetermined

Phone Consult

- If in doubt, just call the duty officer
- Provide advise on legal issues
- Share experience
- Offer suggestions/rule outs
- Confirm conclusions of local investigators

No Response

- Natural cover/wildfires
- Hay bales
- Undiscovered fires – no F.D. response
- Request by citizen or insurance co.

If in doubt...JUST CALL!

Other Emergency Responses

- Additional resources – Statewide MA
- Coordinate Mutual Aid
- Serve as liaison to media
- Coordinate other state response

Operational Considerations

- Overhaul – only what is necessary
- Scene Security – People secure the scene, consent form, ribbon tape
- Evidence – “you touch it, you own it”

Scene Assistance

Give us a Hand!

- People to “dig out” the scene
- Power supply and scene lighting
- Additional tools and equipment
- Personnel to assist with documentation (photograph, sketch)

Great way to learn!

Criminal Investigations

- NOT Licensed Peace Officers
- Work with local Law Enforcement
- Evidence techs
- Interview and interrogation
- Subpoena Authority
- Court Case Preparation and Testimony

Types of Fires

- Fatal Fires
- Known/Suspect Arsons
- Large Loss/Total Loss
- Explosion/Bombings – Bomb squads, ATF, Office of Pipeline Safety
- Vehicle Fires
- Natural Cover Fires – DNR Forestry
- Undiscovered Losses – If in doubt, CALL

Major Incident Investigation Trailers

- Northfield
- Bemidji



Deputy State Fire Marshal Investigation Staff

- County territory lists
- Contact numbers and radio numbers

**FOR NEW FIRE REQUESTS CALL THE
MN DUTY OFFICER**

800-422-0798

Authority to Enter Tyler vs Michigan

- Exigent Circumstance
- Owner/Occupant Permission
- Administrative Warrant
- Criminal Warrant

Separate investigations

- Origin and cause investigation
- Criminal Investigation
- Civil investigation
- Death investigation
- Homicide investigation

Origin and cause investigation

- A scientific forensic endeavor
- Use of NFPA 921
- Investigator qualified to NFPA 1033



Point of Origin

- Location where heat and fuel come together and fuel begins to burn
- An ignition source comes in contact with a fuel supply
- Must have oxygen present

Origin Determination

- Witness information and/or electronic data
- Fire patterns (including arc site mapping)
- Fire dynamics

Fire Patterns

- The visible or measurable physical changes, or identifiable shapes, formed by a fire effect or group or fire effects

Fire Patterns

- Loss of mass
- Depth of char
- Oxidation
- Melting
- Smoke/soot deposition
- Calcination
- Arc site mapping

Identifying the Point of Origin

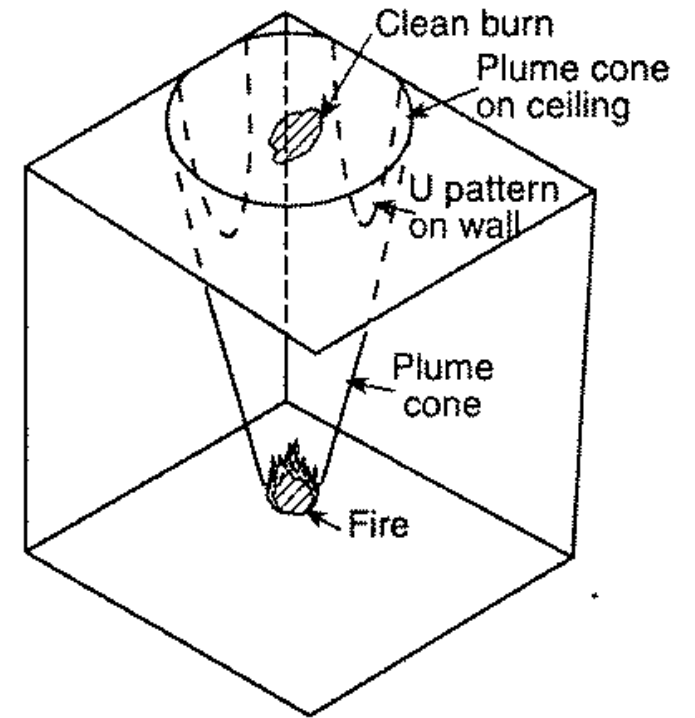
- Depth of char
- Related to intensity of the fire at a particular location
- Charring is usually deepest at the point of origin.



Courtesy of Charles B. Hughes/Unified Investigations & Sciences, Inc.

Plume-Generated Patterns

- V-patterns
- Inverted cone patterns
- Hourglass patterns
- U-shaped patterns
- Circular-shaped patterns



Truncated cone pattern.

Identifying the Point of Origin

- Burn patterns and smoke residue can be helpful in identifying the area of origin.
- Charred V-pattern indicates that fire spread up and out from something at the base of the V.



Fire Cause

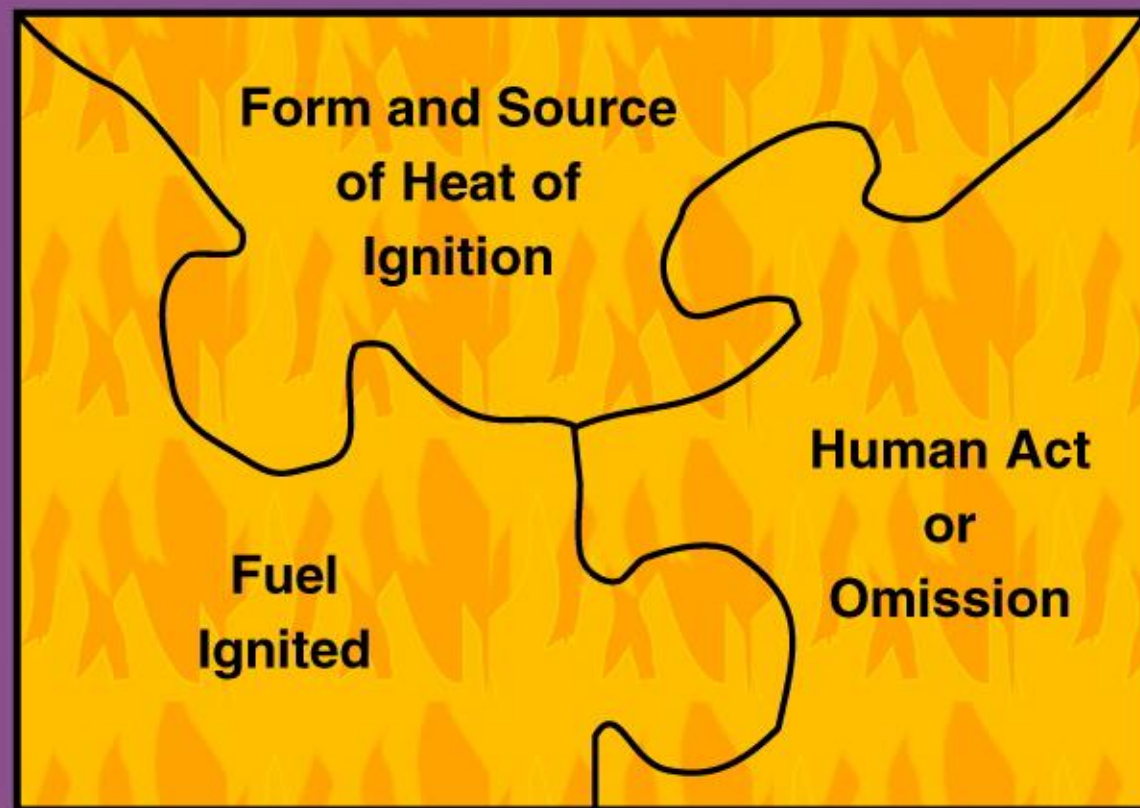
Set of circumstances that brought ignition source and fuel together

Fires result when a competent ignition source and a fuel come together for long enough to ignite

- Ignition/heat source
- Fuel ignited
- Human act or omission
- Failure Analysis

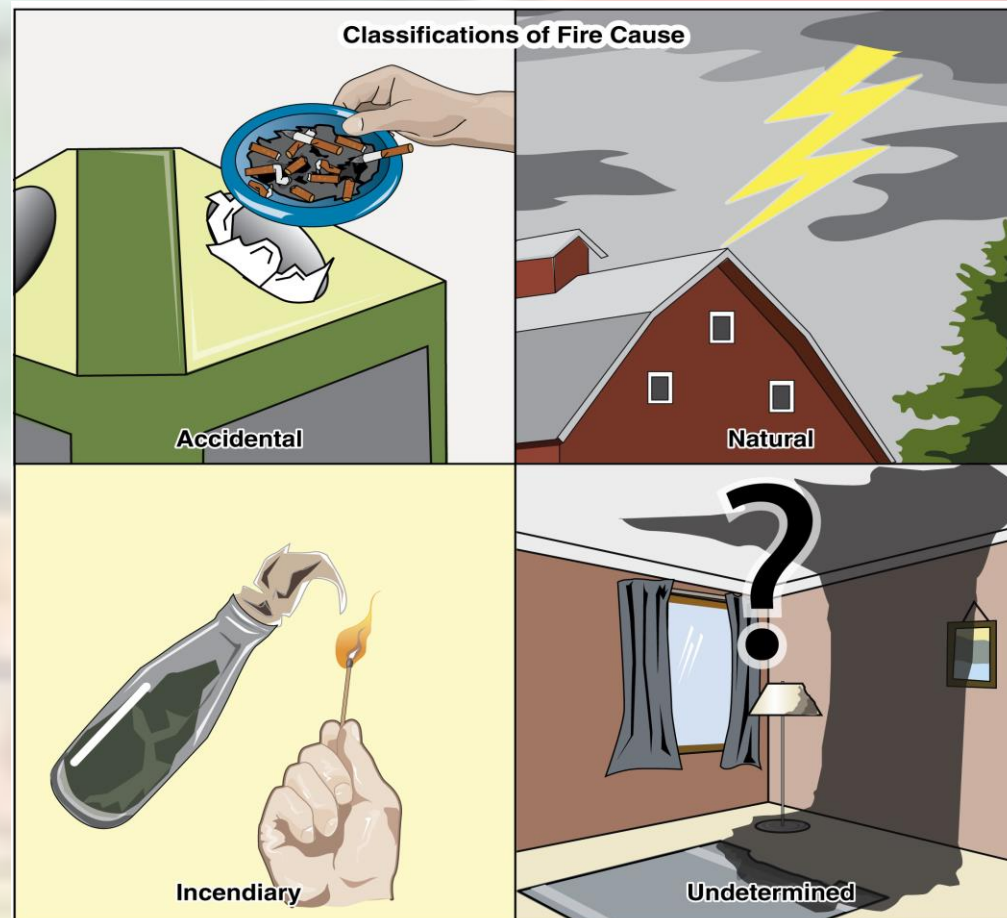
FIRE CAUSE

17-1



Fire Cause Classification

- Accidental
- Natural
- Incendiary
- Undetermined



NFPA 921, Ch. 23 - Incendiary Fires

- Multiple fires
- Trailers
- Lack of Expected Fuel/Ignition source
- Exotic Accelerants/fuel added
- Unusual Fuel Load/Configuration
- Burn Injuries
- Incendiary devices
- Assessment of Fire growth and Fire damage

MN Fire Causes - 2019

- Cooking – 43.9%
- Careless Burning – 12.5%
- Appliances – 7.7%
- Heating – 7.2%
- Electrical Dist. – 6.8%
- Incendiary – 4.9%
- Open Flame – 4.7%
- Smoking – 2.3%
- Youth Fire Setting - <1%
- Other – 10%

Digging out the Fire Scene

- Carefully looking for evidence within the debris
- Inspect the debris, layer by layer, from top to bottom



Digging out the Fire Scene

Layer off debris from top down to look at:

- Sequence in which items burned
- Did it burn from top down or bottom up?
- How much burned?
- What burned?
- Artifacts

Evidence

- All information gathered and used to determine origin and then cause
- Includes Physical Evidence – physical or tangible items
- Can be used in a legal process to establish a fact or prove a point.
- Both Criminal, Civil, or both

Physical Evidence

- Items that can be observed, photographed, measured, collected, examined in a lab, and presented in court
- Example: Burn patterns



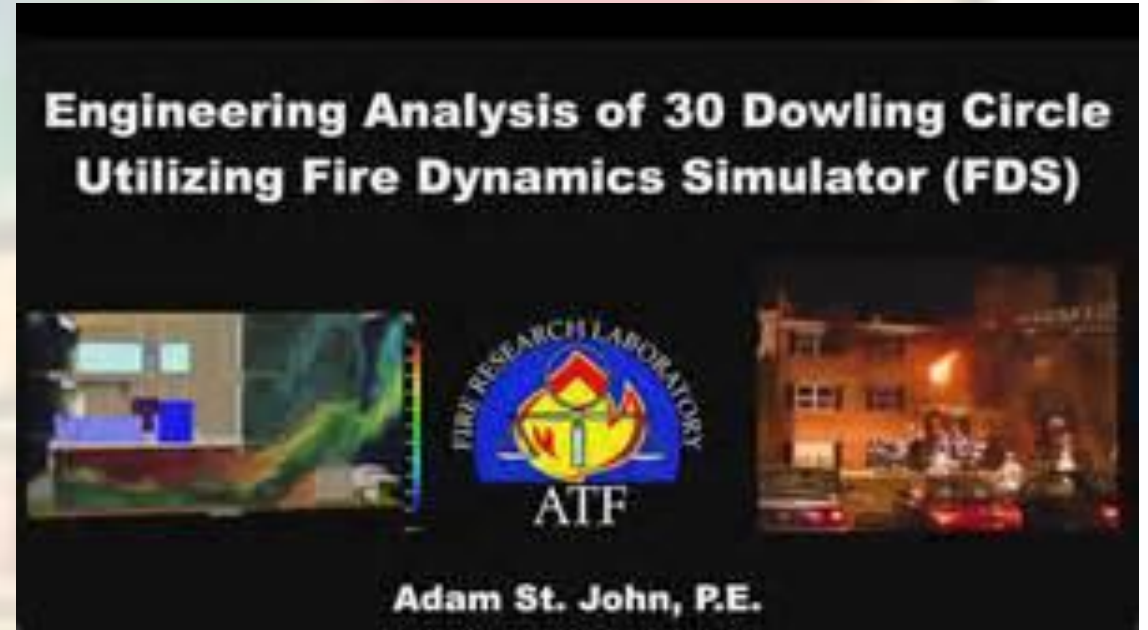
Trace Evidence

- Also called transfer evidence
- Minute quantity of physical evidence
- Can be conveyed from one place to another



Demonstrative Evidence

- Anything used to validate a theory
- Show something could have occurred



Direct vs Circumstantial Evidence

- Direct evidence – facts that can be observed or reported first hand
- Circumstantial evidence – information that can be used to prove a theory

Preservation of Evidence

If you find something that could be possible evidence:

- Leave it in place
- Make sure no one interferes with evidence and surrounding area
- Notify your supervisor or the fire investigator

Preservation of Evidence

If evidence could be damaged or destroyed

Cover it up

- Salvage cover
- Box
- Trash can
- Be creative



Preservation of Evidence

Last resort: Photograph, sketch and pick it up

You are now part of the Chain of Custody

Chain of Custody

- Also known as chain of evidence
- Legal term that describes the process of maintaining continuous possession and control of the evidence from the time it is discovered until presented in court

Chain of Custody

- Every step the evidence takes must be documented
- Each transfer must be recorded

Chain of Custody

Collecting and processing evidence

- Photograph each piece of evidence
- Sketch, mark, and label location of evidence
- Place evidence in appropriate containers
- Tag all evidence
- Record the date, time, location and name
- Keep constant watch on evidence
- Preserve the chain of custody

Preservation of Evidence

Evidence should not be contaminated or altered from its original state in any way

Spoliation – Loss, destruction, or material alteration of an object or document that is evidence or potential evidence in a legal proceeding by one who has the responsibility for its preservation

Identify Witnesses

- People who were on scene may have invaluable information about the fire
- Gather basic interview information for people right away
- Do not be accusatory. Interrogation done by trained officers only

Statements to Public

- No opinions
- Watch what you say and where you say it
- Talk to the “White Helmet”
- “The fire is under investigation”
- Never make jesting remarks or jokes
- Be professional

Firefighter Observations

You are the eyes and ears for the fire investigator

- Time of day
- Weather conditions
- Any route obstructions

Firefighter Observations

Arrival and size-up

- Compare dispatch info to observation on scene
- Vehicle and people on scene/leaving scene
- Unusual items or conditions

Firefighter Observations

Entry

- Prior forced entry
- Try before you pry
- Where windows and doors open or closed, where they locked or unlocked
- Unusual barriers to suppression crews

Firefighter Observations

Fire Attack/Search and rescue

- Location and extent of fire
- Circuit breakers off or on
- Utilities off or on
- Appliances on/off/plugged in/unplugged
- Location and position of people found in building



Firefighter Observations

Ventilation

- Windows doors, open/closed/locked/unlocked
- Windows broken before or after arrival
- Positive, negative, hydraulic ventilation
- Color of smoke/color of flame
- How much of a “push”
- Odors

Firefighter Observations

Suppression

- Fire reaction to water application
- Incendiary devices, trailers, accelerants
- Were alarms sounding?
- Condition of alarms and suppression systems
- Obstacles blocking operations
- Unusual contents of building/lack of contents
- Charring in unusual places



Firefighter Observations

Overhaul

- Leave evidence in place if possible
- Take pictures
- Avoid throwing materials into piles
- Use thermal imaging
- Take your time

Firefighter Observations

Injuries and/or fatalities

- Document location and positions of victims
- Any clothing removed from victim is evidence
- If deceased, leave in place and do not disturb area

Observe: FIRES

- Fire characteristics and behavior:

- ❖ Color of smoke and flames
- ❖ Velocity of smoke
- ❖ Light push or heavy push
- ❖ Height and level of flames
- ❖ Any odors
- ❖ Fire behavior

Observe: FIRES

- Individuals, including the demeanor, dress, location, injuries, smells, behavior, and statements of:
 - ❖ Victims
 - ❖ Witnesses
 - ❖ Crowd members
 - ❖ People leaving the scene

Observe: FIRES

- Response:
 - ❖ Whether burglar and smoke alarms were sounding
 - ❖ Fire attack pattern
 - ❖ Suppression tactics
 - ❖ Overhaul actions
 - ❖ Moving furniture and contents
 - ❖ Changing the position of any items

Observe: FIRE

- Entry and exit points:
 - ❖ Condition of doors and windows upon arrival
 - ❖ Were doors and windows were closed or open? Locked or unlocked?
 - ❖ Whether or not door had to be forced to make entry
 - ❖ Condition of utilities upon arrival
 - ❖ Who or what broke windows

Observe: FIRES

- Strange:
 - ❖ Any item, condition, or absence of an item or condition that seems unusual, out of the ordinary, unexpected, or out of place
 - ❖ Poor housekeeping
 - ❖ Evidence of a possible crime

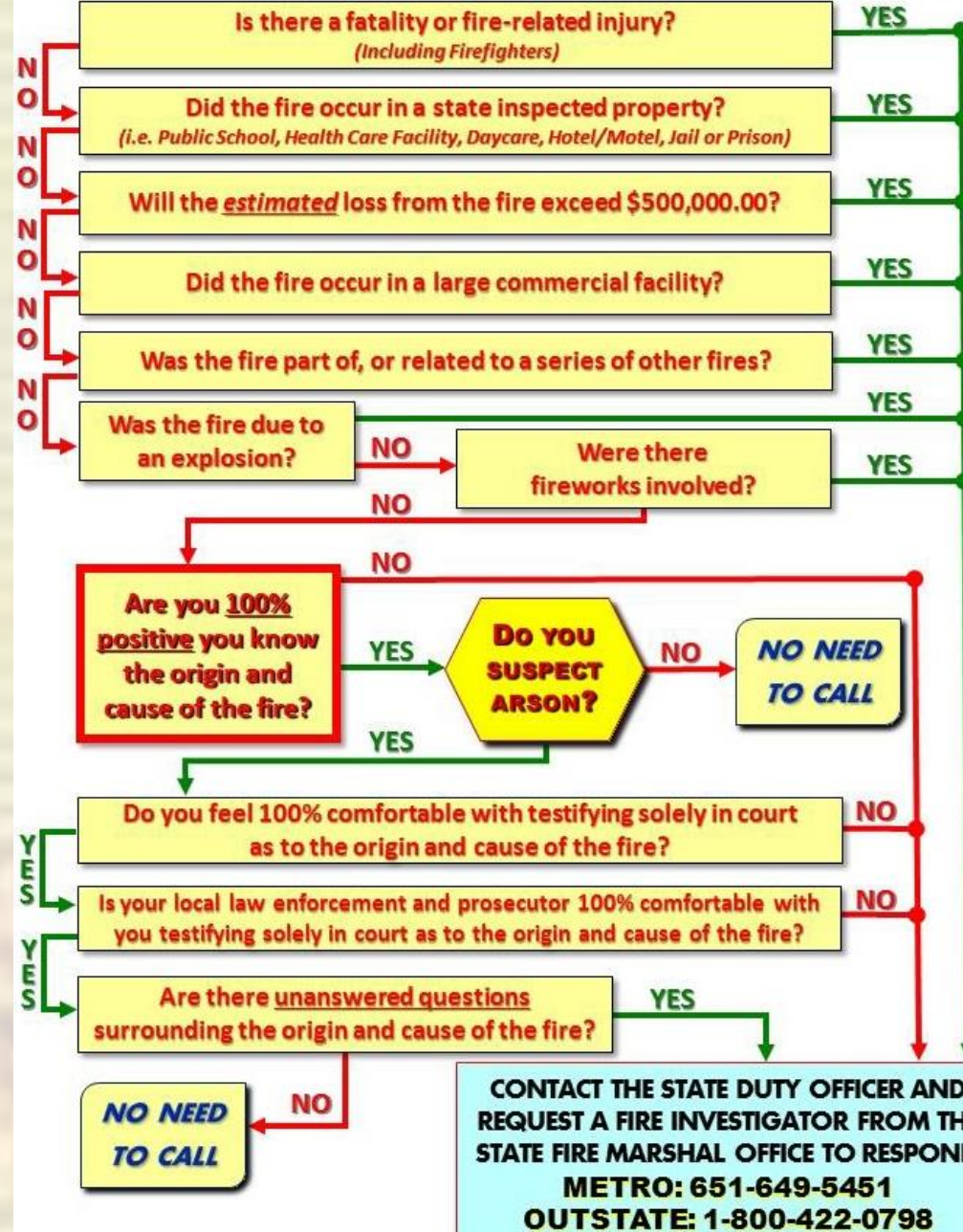
Securing the Property

- Maintaining scene integrity is critical to the fire investigation.
- Deny access to property until fire investigator arrives or the scene is released to the property owner

Securing the Scene

- Keep staff on scene until the fire investigator is contacted
- May have to maintain custody of the scene for up to 48 hours -staff
- Possibly cordon off the scene –ribbon tape
- Possibly board up and secure the scene

**Do I need to call the State Fire Marshal
for an investigation?**





Case Studies

The background of the image is the official seal of the Minnesota State Fire Marshal's Office. It features a large, stylized Maltese cross in the center, with a fire hydrant in the middle of the cross. The cross is surrounded by a circular border containing the words "MINNESOTA" at the top and "FIRE MARSHAL" at the bottom. The entire seal is set against a light blue background.

Deputy State Fire Marshal

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